

LETTER
FROM
DAVID PATERSON. Esq. M.D.
SURGEON IN HIS MAJESTY'S NAVY,
AND LATE
SURGEON TO THE PRISONERS OF WAR AT FORTON;
TO THE
COMMISSIONERS
FOR
Taking Care of Sick and Wounded Seamen.

But of all the advantages to be derived from the use of Nitrous Vapour, none is more remarkable or more likely to be of such extensive application, as its effect on Ulcers; an effect first taken notice of by Dr. Paterson of Montrose, and which has been confirmed, upon every subsequent trial. *Carmichael Smyth on Nitrous Vapour.*

CALCUTTA.

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TO
FRANCIS PEMBLE STRONG, ESQ.

SURGEON TO THE SUBURBS, CALCUTTA,

&c. &c. &c.

My dear Strong,

In publishing this edition of my Father's Letter on Fumigation you may perhaps think that I wish to revive the long agitated question of Contagion. You, however, are aware that I am neither a Contagionist nor an Anticontagionist touching the Endemic Pyrexia of Bengal.

I agree with that philosophic and all-eloquent physician, Dr. Johnson that here as in most other instances "Truth lies between the extremes"—"As far as my own observations and judgements could guide me" adds, this very Classical Writer, "I have been led to conclude that the Endemic Fevers alluded to are not contagious till a certain number of patients are confined together under certain circumstances, when the effluvia may render them so."

I am exactly of this opinion, and I am thoroughly convinced, in uniformity with this opinion, that in many situations in British

India, as for example in boats on the river; during marches; and temporary receptacles for the sick, where necessary seclusion, cleanliness, and ventilation are impracticable, fumigations by the mineral gas, as directed by my Father and executed by him in Forton Hospital, will be most advantageous. Let those who have got the febrifuge tact, deny this if they can. — In putrid ulcers the benignity of the nitrous vapour is astonishing.

My dear Strong, I am happy I have here an opportunity of expressing to you my high sense of gratitude for the very gentlemanly and disinterested conduct you have shewn towards me by aiding my Researches in to the Analysis of Mind and General Anatomy. The Hospitals of Rossa and Allipore have not only enriched my mind with many new ideas; but the high order and physical purity in which they are kept, will ever be a practical lesson to all my Medical theories.

With the sincerest esteem,

I remain very truly your's

GEORGE MURRAY PATERSON.

M. D.

Calcutta, 19th April, 1822.

GENTLEMEN,

Last winter while I had charge of Forton Hospital, although in the midst of very fatiguing duty, and engaged as I was in making some favorite experiments of my own; yet being extremely anxious to acquire some practical knowledge of Dr J. C. Smyth's Nitrous Vapour, I failed not, after receiving your authority, to put his fumigating plan in execution, as extensively as it was possible; nor at the same time, to note down the phenomena, as they occurred with as much accuracy as my leisure time would permit. And, now, in order that you may see, in the fairest points of view, some of the effects of the vapour resulting from that highly ingenious and very salutary process; and, also with the view no less of doing justice to Dr. J. C. Smyth than of rendering his Nitrous Vapour more extensively useful in the Navy, Army, &c. I beg leave to communicate to you the contents of the following pages, which should they appear to you in any degree calculated to be serviceable in pro-

moting the welfare of these realms, I humbly request you will be pleased to lay them before the Right Honorable the Lords Commissioners of Admiralty.

In pursuing my present plan, I shall after giving you a short, but not imperfect account of the method I followed in fumigating the wards of the hospital, state in a faithful manner, such facts, whether of a general, or of a particular nature, as arose from the trials that were made, after which by most humbly offering a few observations connected with the subject, I shall conclude my letter.

Every evening a certain number of wards were fumigated, each by means of three pipkins, for an hour; the gally-pot in each pipkin, containing the quantities of pure Nitre in powder, and Concentrated Vitriolic Acid, as directed by Dr. Smyth.* Three persons, each carrying one

* For a more particular history of the process, vide Dr. J. C. Smyth's letter to the Right Honorable Earl Spencer, &c. &c. containing an account of the experiment made on board the *Union* Hospital Ship, to determine the effects of the Nitrous Acid in destroying contagion, &c.

fuming pipkin, went round a ward. following one another at some distance, and holding the pipkins under each bed, for a considerable time, as they went along ; and they continued doing so as long as the fumigation lasted. The wards, by opening the windows and doors, were afterwards filled with atmospheric air.

The Vapour, proceeding from the decomposition of the Nitre, by means of the Concentrated Vitriolic Acid, was in such great quantity, that a ward, 57 feet by 20, and 10 feet 6 inches high, was filled with it, by means of three pipkins, in the manner I have mentioned, in the space of fifteen minutes.

On the wards being filled with Nitrous Vapours, some of the patients, who laboured under affections of the lungs, were seized with fits of coughing ; none of them, however to any great degree, with little or no exception, the patients, in the wards that were fumigated, bore the Vapour, without feeling any disagreeable effect from it ; if indeed, a pipkin was accidentally held very close to the mouths of any of the patients, which

from awkwardness was sometimes the case, coughing was immediately produced: and, in one instance, vomiting was occasioned. These circumstances, however, did not prevent the patients from becoming, in a short time, very fond of the fumigating business; for my part, I frequently remained in a ward during the whole time of the fumigation, often indeed with a fuming pipkin in my hand, without experiencing any disagreeable effect whatever. The fume was to me pleasant. When, during the fumigation, I remained in a ward, I always wore black clothes, which even, after being repeatedly exposed to the nitrous vapour, were not in the least either stained, or changed from black to a brown colour.

In the mornings, particularly in dry weather, the wards that had been fumigated the preceding evening, even although they had been washed early in the morning, and the windows kept open, had a very agreeable smell, much more pleasant than that which was experienced during the fumigation. By this agreeable odour, in the morning, I was able to judge whether or not due pains had been bestowed, the preceding evening, in fumigating the wards.

One dysentary ward, one fever ward, and one surgery ward, containing the worst kind of ulcers, were, at first the places filled every evening with the Nitrous Vapour, but, as the good effects, resulting from the fumigation were to me very obvious, I soon used it more extensively. The patients, in general, who laboured under old dysenteries, many of them contracted in the West Indies, seemed to be greatly relieved; ultimately, a great number of the old dysenteries, where the patients were not far advanced in life, did well. The fevers, which were of no uncommon genus, and which were in their nature very mild, soon disappeared, without exhibiting any symptoms of typhus; and the ulcers, instead of further degenerating or spreading, put on a favorable appearance, and healed.

It is, I presume, of no small consequence to observe, that excepting some marked cases of dysentery, among the servants of the prison and hospital, in the months of August and September, before the arrival of the prisoners from the West Indies, and one case of typhus (in ward 18) with now and then a case of small-pox,

among the West Indians, after their arrival, there was not any contagious, febrile disorder that made its appearance within the walls of the hospital, while I had charge of it, notwithstanding the many sources of contagion to which, in my opinion, all in and about it were exposed. During the last five months of my time, no fewer than 1686 patients were admitted in to the hospital, as may be seen by the hospital books.

The following Table serves to shew, at one view, the highest number of patients in the hospital, the number discharged and died, weekly, for four weeks before, and six weeks after the Nitrous Vapours was first used; viz. from the 16th of October, to the 26th of December, 1796. To include a greater space of time would be improper; because, before the 16th of October, there were but few patients in the hospital; and because, after the 26th of December, there were a great number of extremely bad cases of gangrenous feet, pneumonia, &c. received into it, from Portchester Hospital, and from the *Vigilant* and *Captivity* Prison Ships.

TABLE.

<i>Before the Nitrous Vapour was used.</i>				<i>After the Nitrous Vapour was used,</i>			
Weeks.	Number in the Hospital	Number Dischrgd	Number Dead.	Weeks.	Highest Numb.in Hospital.	Number Dischrgd	Number Dead.
1	223	2	8	1	340	27	6
2	372	4	21	2	332	7	5
3	371	„	13	3	342	11	8
4	369	1	9	4	340	8	4
				5	486	12	1
				6	539	63	5
		7	51			128	29

After these general observations on the Nitrous Vapours, I shall humbly beg leave to offer the following Cases, in which it was undoubtedly, used with very remarkable success.

CASE I.—*Jean Louis*, French Prisoner, of colour, eighteen years of age, from the West Indies, was admitted into the Hospital, on the 28th of October, 1796, for an illconditioned ulcer on the inferior and interior part of the right-leg, After he had been some time in the hospital, the

ulcer began to put on a favorable appearance, and was soon considerably diminished in its size, merely by means of simple dressings.

On the 29th November, however, the ulcer according to the common phrase, became foul; and by next day, it had spread to such a degree, that it was nearly as extensive again as it ever had been, attended with very acute pain, and with a very copious thin dark coloured foetid discharge. The patient's pulse, at this time, was 120, tongue clean; appetite impaired, belly open, sleep much disturbed.

31st.—From the 29th to this time, a common poultice, thrice a day, was the only application; but now, in addition to the poultice, the ulcer was dressed with the powder of Peruvian Bark, a cooling medicine, with an Opiate at bed-time, was ordered; and a vegetable diet with milk was enjoined.

December 2d —The ulcers still more extensive than it was on the 31st ultimo. It now extended from the tarsus six or seven inches upwards, and from the tibia more than half round the leg, it was still in a sloughing state, with high reflected edges. The other symptoms much the

same as before. Finding that the plan hitherto pursued had not produced any good effect either on the ulcer, or on the system, the whole of it, excepting the poultice, was abandoned, and the nitrous vapour adopted, the ward in general and the bed of the patient in particular, were carefully fumigated, the ward once, the bed twice a day.

3d.—The ulcer had stopt spreading, and in some place looked clean. Such a sudden change was to me astonishing, pulse now 110, tongue clean, belly open, slept better in the night of the 2d, than for some time before, notwithstanding the omission of the Opiate.

4th.—The ulcer was clean, and discharged good matter, the patient felt himself comfortable, pulse about 90.

6th.—The discharge continued to be good; and the ulcer had made considerable progress in healing, the patient felt himself perfectly easy, and his health was already very much mended.

The fumigation was continued until the 26th of December, from which time, owing to a want of materials, it was discontinued until the 11th of January, 1797. The ulcer, during the time

the fumigation was used, and even to the 1st of January, 1797. continued to heal kindly, and rapidly : but at that period, it again became foul and sloughing, and was soon as extensive as before, the appetite was again impaired, pulse 120, and small, belly open, the patient much weakened and emaciated. Half a drachm of Peruvian Bark, thrice a day, and eight ounces of Wine in the twenty-four hours, were ordered: and the ulcers was dressed twice a day with the powder of Peruvian Bark and common Poultice. An Opiate was occasionally allowed at bed-time. This treatment was preserved until the 11th, when having experienced no good effects from it, it was discontinued, and recourse again had to the Nitrous Vapours, and common Poultice, as on the 2d of December, 1796.

12th.—The ulcers had stopt spreading, and in some places had begun to clean. The pulse was less frequent, and more full, and the patient was, in every respect, better, and more comfortable. The Nitrous Vapour, &c. were continued.

13th.—The ulcers was perfectly clean, with florid granulations, and with about the eighth of an inch of new skin round the edges. The plan was continued.

20th.—The ulcer looked very healthy, and was contracting rapidly. The plan was continued.

February 5th.—The ulcers had contracted more than one half. The plan was continued.

March 12th.—The ulcer was nearly healed, (not so much as the breadth of a six-pence being open) and looking healthy. On this day I finished my duty, and consequently, my observations, at Forton Hospital.

I have here to observe, that about the 1st of January, 1797, all the ulcers in the same ward, (No. 14,) with the above, were more or less in a bad state; and that they all about one and the same time, began to put on a favourable appearance; and also that, in a short while, many of them healed. Likewise, it is necessary to observe, that particular attention was paid all along to cleanliness and ventilation.

CASE II.—*La Granade*, French Prisoner, aged 26 years, from the West Indies, was admitted in to the hospital on the 16th of December, 1796, for chilblains. In the end of February, 1797, an ulcer broke out on his left leg, which

became very foul and sloughing, and did not yield to common remedies. On the 7th of the following March, the Nitrous Vapour was used, exactly in the same manner as in the preceding Case, and by the 12th, the ulcer was perfectly clean.

CASE III.—*Elie Double*, French Prisoner, aged 22 years, from the West Indies, was admitted in to the hospital on the 28th of October, 1796, for an ulcer on the anterior and middle part of his left leg. By the middle of February, 1797, the ulcer was cicatrised, but with a considerable protuberance, remaining over that part of the tibia, as if the periosteum and even the bone itself, had been in diseased state. About the end of February, the cicatrix became inflamed, soon suppurated, and degenerated in to a foul sloughing ulcer, which, instead of yielding to any of the various applications, got worse and worse every day. From the end of February, (I cannot exactly tell the day) cataplasms of different kinds, Myrrh and Peruvian Bark, were tried externally; and Wine, Peruvian Bark, Opium, &c. were administered internally. At the same time, great attention was bestowed in keeping the ward

extremely clean, and thoroughly ventilated. Finding not only that no good effect was produced by any of these means, but even that the ulcer, the sound parts being still in a mouldering state, grew more and more extensive; I came to a determination, considering myself sufficiently authorised from the experience I had had, to make trial, in this untoward case of Dr. J. C. Smyth's nitrous vapour. Accordingly on the 7th of March the fumigation was put in practice, in the same way as in the foregoing cases, and it is with heart felt pleasure I relate it, by the 12th, that was in 5 days time, and on the day I finished my duty at Forton, the ulcer was perfectly clean and healthy.

CASE IV.—*François*, a negro French prisoner, age unknown, was admitted into the hospital on the 26th January 1797, for a wounded little finger. On examining the wound, I found that the last bone and the surrounding ligaments were the parts most materially injured. The bone was fractured, and the soft parts were contused to a very great degree, with a small lacerated wound at the tip of the finger. Deeming it necessary, I immediately amputated the limb at the joint form-

ed by the second and last phalanges. The stump, the bone being well covered, and the soft parts looking healthy, had all the appearance of doing well, during the first fortnight ; but unfortunately, at the expiration of that period, it began to put on a very unfavourable aspect. Instead of the diseased parts being sinuous, or having, what is perfectly understood in surgical language, a glassy appearance, which sometimes indicate a diseased bone, they became enlarged to a prodigious degree, reflecting very considerably, so as to resemble a ball on the end of the stump ; and, at the sametime, appeared foul, discharging a dark thin fetid matter. In this state, peruvian bark, opium, &c. were tried, as also cataplasms, but to no purpose. In the end of February, recourse was had to the nitrous vapour ; and by means of it. in six days time, the ulcer was perfectly clean.

CASE V.---*Bastem*, a negro French prisoner, age unknown, was admitted into the hospital on the 28th January 1797, for an ulcerated toe. This case very similar to the finger of which I have just taken notice. and, like it, after various ineffectual applications, was cleaned, and put seem-

ingly in a healthy state, by means of the nitrous vapour used according to the manner I have already related. The four last cases were in the same ward, No. 4.

Having, with respect to Dr. J. Smyth's Nitrous Vapour, agreeably to my promise, finished the most important part of my experiments, with the phænomena resulting from them, in order to shew you that that Vapour, under proper management is capable of producing very happy effects on the human frame, I shall now most humbly offer a few observations which appear to me to be connected with the subject.

And, to proceed ; I am in great hopes that the facts detailed in these pages, while they serve as so many proofs of the utility of Dr. J. C. Smyth's fumigating plan, will, at the same time, answer the happy purpose of not only removing the ill grounded fear of Dr. Trotter, and of convincing him, as well as those who think as he does, that no danger is to be apprehended from the combination of Azote with the Nitrous Vapour ; but, also, of conquering the prejudices of those gentle-

men who imagine (for some highly respectable medical practitioners have lately mentioned to me their apprehensions) that that Vapour, from its being loaded with Vitriolic Acid, must be intolerable to the lungs, and of course highly pernicious to persons subjected to its influence.

With regard to the bad, or deleterious effects of the Nitrous Vapour, I cannot say from experience, that I am acquainted with any of them. The trials that I made of that Vapour were on a great number of diseased persons, who although crowded together within the walls of an extensive Hospital, and from that circumstance, as well as others of at least equal moment, exposed to the influence of noxious effluvia, were obviously, in many instances, as already mentioned, benefited by its salutary effects, many patients were cured; others were put in the fair way of being cured. And, I must add, for it is not, I presume, altogether improbable, that, by means of the Nitrous Vapour, with other no less important measures, which I adopted, and incessantly followed when in my power, the patients who were under my charge, in Forton Hospital, were preserved from

the attacks of contagious fever. I have ventured to say with other no less important measures, because I am well aware, as Dr. J. C. Smyth undoubtedly is, that without the most strict attention to cleanliness, and to the circulation of pure or atmospheric air, neither the nitrous vapour, nor any thing administered with similar intentions, can prove so efficacious as we could wish, in preventing or putting a stop to contagious fever as well as other diseases, though perhaps not so immediately, yet ultimately as fatal; I am here under the necessity of observing, having forgot to do it in the proper place. that the solitary case of Typhus, which, as before mentioned, was in ward eighteen, did not originate in the hospital, but in the *Captivity* prison ship. What the nature of the disorder had had been primarily, I am at a loss to say. The patients died, and fortunately so did the disease, for I saw not another fever of a similar nature in the hospital. As no contagious fever (I mean Typhus, or what some authors have called jail fever, others hospital fever, &c.) prevailed, during my time, in Forton Hospital, I cannot say positively that the nitrous vapour solely prevented such a fever from prevailing. All that

I can say is only that the circumstance of no contagious fever having prevailed in Forton Hospital, during my time may be considered as being of a very singular nature, more especially when we take into our view the vast number of patients, in the most filthy state, from the West Indies, &c. that were received. The very particular attention that was paid to the patients, on their being received, in stripping them of all their clothes, in bathing them, in shaving their heads, in burning all their clothes, and also in keeping the Hospital, at all times, extremely clean, and thoroughly ventilated, may it is probable, have contributed not a little towards preventing contagious fever. And further another circumstance which, perhaps, had operated very powerfully in assisting to obviate contagious fever, and which deserves to be very particularly remarked was the changing of the wards as frequently as it was possible, and that according to the nature of the complaints they contained; for instance, and by comparison, wards that contained convalescents, and also those that contained slight or chronic diseases, were changed frequently, those that contained very bad surgical cases most frequently. By the changing

of wards, I mean the removing of the patients from one that they had occupied from some time, to another that was perfectly purified.

When a ward of whatever description was changed, it was first emptied, by the patients being removed into another, and by its bedding being sent to be baked, fumigated, or washed; and then it was without loss of time fumigated by means of Sulphur: then white-washed: then its cradles cleaned, and washed with vinegar, then the floor of it thoroughly cleaned and, lastly, its windows on the one side, and its scuttles on the other, were kept open, always when the weather would permit, until it was again occupied by patients, which, if the state of the Hospital admitted, was not before eight days had expired. Such regulations as the above ought, in my humble opinion, to be constantly and very particularly observed, by all Medical men who have the immediate charge of Hospitals for prisoners of war; many of them, I presume, might, with propriety and utility, be observed in any Hospital; and in concluding this subject, I beg leave humbly to suggest to you that no Hospital ought to

be full, but, on the contrary, that there should always be, in all, according to their different sizes, two, three, four, or more wards left empty, for the very salutary purpose of changing.

Cleanliness, ventilation, and changing of the wards, whether with the view of obviating or removing diseases, are, in all Hospitals, as well as in all places where prisoners of war are confined, &c. absolutely necessary, where they are observed, medicines will become less needful; and when needful, they will in their operation, be more effectual; but where they are neglected, the physicians and surgeons will be subjected to the very unpleasant trouble of giving their attendance, and of prescribing, to very little purpose. Warmth ought also to be attended to.

In such establishments as Forton, cleanliness, a free circulation of air, proper diet, &c. ought, agreeably to the very particular orders which you issue, to be most rigidly attended to, from one end of these establishments to the other. But, I am afraid, orders are not always rigidly executed. The unpardonable neglect of servants, in

not executing, with promptitude and scrupulous punctuality, the orders with which they are entrusted, is to be lamented, but, I fear, not to be, on all occasions, either prevented or corrected. From what I know of the establishments in question, I shall venture to say, that, were they always to be properly conducted by the Servants who have the immediate charge of them, we should hear less frequently of the prisoners, &c. falling a prey to contagious fever than we have hitherto done, this is a subject, however, with which, at present, I shall not further concern myself, excepting to make the following observation, which is, that while due care is not taken, in the first instance, to prevent contagion from taking effect, that use of Dr. J. C. Smyth's nitrous vapour becomes, undoubtedly, the more particularly necessary, but I am extremely sorry to think that Dr. Smyth's plan, as well as others equally well intended, should not always be put in execution, but more especially in cases of emergency, with that facility, with that eagerness, with that candour, which duty, justice, and humanity, continually require. Altho' I have, in the course of these observations, laid very considerable stress

on cleanliness, ventilation, changing of wards, &c. yet I would not, by any means, wish it to be supposed that I have done it with the view of superseding the use of the nitrous vapour, on the contrary, while on the one hand I am sensible that the nitrous vapour cannot without cleanliness, ventilation, changing of the wards, &c. be so efficacious as we could wish, in putting a stop to contagious fever; I am, on the other hand, no less sensible that that fever, when raging to a violent degree, cannot be exterminated by means of cleanliness, ventilation, &c. without the assistance of some other means. With respect to Hospitals, Ships, Prisons, &c. where people are crowded together, where the introduction of contagious fever is dreaded, or where it actually prevails, the nitrous vapour, with due attention to cleanliness, ventilation, &c. may at once, I presume, not only be considered the most convenient, the most elegant, and the most ingenious, but also the most efficacious remedy for the purpose of counteracting different species of contagion, that has yet been offered to the public; further, altho' cleanliness, ventilation, and the changing of wards, very strictly attended to, might, in a very great

measure, prevent contagion from taking effect, or from spreading extensively, yet, supposing them to be attended to as strictly as, from the nature of things, it is possible, they could not, I am too much afraid, destroy contagion, when prevailing in an extensive Hospital, &c. For example, let us suppose only five or six hundred patients confined in Forton Hospital, and labouring under fever; and let us also suppose it necessary for the sake of cleanliness, and of putting a stop to the contagion, to completely shift all these patients once, perhaps many of them twice, and some of them even thrice, every day; how, give me leave to ask, would it be possible to furnish such a great number of patients so frequently with the clean things required? For my part, I am fully persuaded that it would prove difficult, so extremely so, indeed, that it would amount even to an impossibility. With respect to ventilation, has it not been found, even when it has been attended to very particularly, to be without the assistance of other means, inadequate to the speedy destruction of contagion? And with regard to the changing of wards, were it sufficient of itself to destroy contagion, might it not, I shall

say sometimes, from the number of patients received being equal, nay even more that equal, to all the wards of which the Hospital consists, be utterly impracticable? Other examples, and other queries to the same effect, were they not deemed superfluous, might be advanced: then, considering the business in this point of view, does it not become a duty incumbent on us to look out for, and to try other means more active, and more diffusive, which with the assistance of cleanliness, ventilation, changing of wards, &c. may be employed for the purpose of more speedily, and more effectually destroying contagion and may not the nitrous vapour of Dr. J. C. Smyth, as I have already mentioned, be deemed of all other remedies extant, the most convenient, the most elegant, the most ingenious, and the most efficacious for answering the wished-for purpose, whether at Sea or on Shore?

The extraordinary effects which we have seen the nitrous vapours produce, in cases of putrid ulcers, are facts of the utmost importance to mankind, and certainly deserve the most serious attention of medical practitioners, they not only

shew, in the most satisfactory manner, the power of that vapour in such cases, but also point out, in my humble opinion, the probability of its having, in a similar way, as salutary a power in contagious fever, and in many other diseases proceeding from other species of contagion. This opinion may perhaps, seem singular, but I shall endeavour to evince its consistence with reason and experience.

In Hospital practice, it has been frequently observed, not only by me, but by other Medical Practitioners, that all the Ulcers of Patients in the same Ward, have on a sudden, and nearly at one and the same time changed from apparently, an healthy to a foul, sloughing, or putrid state. I have bestowed considerable attention in observing this change, and in the course of my practice have been able to make the following remarks, which I shall here arrange as they stand among my memorandums.

That first, one ulcer degenerated, then another, and so on until all the ulcers, in the same ward had taken on a similar disposition.

That those ulcers nearest the one which first degenerated were sooner affected than those at a greater distance.

That this lamentable change did not happen in all the surgical wards at the same time.

That the patient, when their ulcers were in this degenerated state, laboured, more or less under Symptoms of fever, such as a frequent small pulse, unnatural heat, sometimes chilliness, dry skin, loss of appetite, &c.

That common dressings, common poultices, carrot poultices, turnip poultices, myrrh, peruvian bark, applied to the ulcers, had no good effects.

That peruvian bark, wine, opium, given internally, had, I thought, instead of good, bad effects.

That, in one case, yeast was tried, both internally and externally, but the disease evidently gained ground under the course.

That the acetum nitrosum,* whether used internally or externally, seemed to have good effects.

That the changing of the wards had always good effects.

That the nitrous vapour, with the like attention to cleanliness and ventilation as was in common bestowed, had, without changing the ward, as in the five cases mentioned, as well as in many others, effects superior to those resulting from the changing of the ward, without the use of the nitrous vapour. That the nitrous vapour had not the like good effects, without cleanliness and ventilation, as with them. From these premises, I have thought it warrantable to draw the two following conclusions:

1. That such a degeneration of ulcers, in Hospitals, from apparently, an healthy, to a foul, sloughing, putrid, state, can only be accounted for on the principle of contagion.

* Vide Paterson on Scurvy.

2. That the nitrous vapour, with due attention to cleanliness, ventilation, changing of the wards, &c. is seemingly, the remedy of all others extent, best calculated for preventing, or speedily destroying the contagion; and from this naturally arises the following query:

As under such regulations, the nitrous vapour has such great power in preventing or destroying one species of contagion, may it not under the same regulations, be equally powerful in preventing or destroying other species of contagion? I must here observe, that the second conclusion does not exclude the use of other medicines. Suitable remedies, both internally and externally used at the same time with the nitrous vapour, will, no doubt, forward the cure. But, as these pages are intended for the purpose of pointing out some of the effects of Dr. J. C. Smyth's nitrous vapour, and not as a Treatise on Ulcers, I cannot, with respect to the latter, make, with any degree of propriety, an attempt on either the indication of cure or remedies.

On the present subject, I might, to what has been advanced, add many more medical observa-

tions, were I not of opinion that, after the experiments of Dr. Smyth,† they would appear superfluous; and I might, with equal propriety, have recourse to chemical reasoning, were I not prepossessed with the idea that, considering what has been already said, respecting Dr. Smyth's nitrous vapour, by that very ingenious chemist Mr. Keir, of Birmingham, it would be extremely presumptuous.

On the whole, and to conclude, I cannot help being of opinion, as well as from the facts with which Dr. Smith has favored the Public, and from what Mr. Keir has advanced, as from my own experience, that very great benefit must result to mankind, from the proper use of the nitrous vapour, on board of Ships, in Hospitals, in Prisons, in all places where people may be crowded together, and even in Private Families, in preventing and in putting a stop to contagion, as well as in mitigating and removing other diseases, in which other Medicines would not perhaps have the

†Vide Dr. J. C. Smyth's letter to the Right Honorable Earl Spencer, &c. &c. &c.

like good effects. And, therefore, I most sincerely wish, that the plan of Dr. J. C. Smith may be universally adapted; ‡ and that it may for the good of our Navy and Army, for the honor of our Country, and for the benefit of mankind, be practiced by Medical Men, and others, without their conceiving any prejudice against either it or its ingenious Author.

I have the honor to be,

Gentlemen,

Your most obedient and very
humble Servant,

(Signed) DAVID PATERSON.

Montrose, 21st August 1797.

‡ Vide Dr. J. C. Smyth's letter to the Right Honorable Earl Spencer, &c. &c. &c. Appendix.

P O S T C R I P T.

Since finishing the preceding letter, I have had an opportunity of making further trial of the nitrous vapour, in a disease of a singular nature, the whooping cough, which has been prevailing here all this Summer, made its appearance in my family last month; this being a contagious disease, and a change of air having been found useful in removing it, I supposed that the nitrous vapour might not only operate in counteracting the contagion, but also have effect similar to the changing of situation; and hence, that it might, providing the lungs of my little Patients could bear it, prove a convenient, an elegant, and useful remedy, on the present occasion, it was from these conjectures, and knowing that it would have been extremely inconvenient for me to have sent my Children from home, that I ventured to make trial of Dr. Smyth's fumigating plan, the result of which I shall state, as briefly as possible, by sketching the following cases:—

My third Child, a Girl of five years old, was seized with a slight inflammation of the throat, attended with hoarseness, about the 6th of last month, and about the 10th with a Cough, on which the inflammation and hoarseness went off, the Cough for some days seemed to be of a common kind, from Cold, but by the 15th, it assumed the appearance of Hooping Cough, accompanied with a slight degree of Fever. By this time, my second Child, a Girl of six years, and also, my fourth or youngest, a boy of fifteen months, had begun to Cough.*

On the 7th, the third Child had frequent and violent fits of coughing, with the hoop strongly marked, and the second and fourth, though not so ill, evidently laboured under the disease, in the evening of this day. I began the use of the nitrous vapour, I shut up my little patients, with a Servant, in their bed-room sixteen feet by twelve, and six feet nine inches high, myself Superintending the business, instead of a pisskin for holding the hot sand, I used an iron pot, in which

* My oldest Child had the Hooping Cough about three years ago.

was placed two gallipots, containing the concentrated vitriolic acid and nitre, according to the direction of Dr. Smyth. In about five or six minutes the room was filled with vapour, and continued so for an hour, without any of the Children coughing or shewing any signs of uneasiness.

18th, 19th, 20th. The fumigation was repeated every evening, and continued an hour, without Coughing, or any uneasiness occurring.

21st. Now, all my little Patients seemed better, the fits of Coughing recurring less frequently, and the mucus being more easily discharged than before.

14th September, from the 20th ultimo, to this time the fumigation was repeated only six times, exactly in the same manner as before, without the Children complaining of, or apparently feeling any disagreeable effect from it, and now, on account of the mildness of the disease, the Cough not being troublesome even throughout, it was discontinued. At this time, the youngest Child evidently laboured under symptoms of Teething,

the Cough, however, did not appear in the least aggravated. To the second and third Child, during the course of the Nitrous Vapour, no other Medicine was given, but to the Youngest, who was frequently constipated, a weak Solution of Antimon, last, which always operated downwards, and sometimes upwards, was occasionally administered.

23d. The second and third Child continued well, and the youngest, though much distressed with Teething, Coughs but seldom, and very gentle.

Now, after having stated these facts, whether or not, the Nitrous Vapour had any effect in counteracting the contagion, or otherwise rendering the disease mild, and of short duration, or whether or not, the disease would have naturally appeared mild, and have continued but a short time, without the interference of art, are points which I shall not take upon me to determine, further trials are undoubtedly necessary for the purpose of forming a judgment; it must be confessed, however, that, even the few trials which

have already been made, serve, in the mean time, a very useful purpose, they clearly show, that even young Children, labouring under a disease, in which there is always, more or less, a determination to the lungs, &c. are capable of inspiring the Nitrous Vapour, without feeling from it, any disagreeable effects, hence, there cannot, I presume, be any objections to further trials of it being made in the Hooping Cough also; these facts lead naturally to other important inferences, but, as they must be to you sufficiently obvious, I avoid making them.

I have the honor to be,

Gentlemen,

Your obedient humble Servant,

(Signed) DAVID PATERSON.

Montrose, 23d September, 1797.

There is a great deal of
work to be done in the
country, and it is necessary
to have a good system of
land reclamation. The
first step is to clear the
land of the old crops, and
then to plant the new crops.
The second step is to
drain the land, and the
third step is to plant the
new crops. The fourth
step is to plant the new
crops, and the fifth step
is to plant the new crops.

THE END